CLAIMS

1. A sandwich sheet (2) suitable for a forming and welding operation and exhibiting excellent resistance to high temperatures, comprising:

- two sheet metal facings (1, 1') having a melting point T_f; and
- a metal core (4) having a melting point T_c, it being possible for T_c to be equal to or different from T_f, characterized in that the core (4) has a density less than the density of each of the facings (1, 1') and in that the core (4) and each of the facings (1, 1') are bonded together by means of a metal bonding agent (3, 3') having a melting point T_m of less than T_c and less than T_f.

2. The sandwich sheet (2) as claimed in claim 1, characterized in that the metal core (4) occupies between 10 and 80% of the volume that separates the two sheet metal facings (1, 1').

3. The sandwich sheet (2) as claimed in claim 2, characterized in that the metal core (4) occupies between 20 and 60% of the volume that separates the two sheet metal facings (1, 1').

4. The sandwich sheet (2) as claimed in any one of claims 1 to 3, characterized in that the core (4) consists of a metal wool, a knitted metal fabric, a woven metal fabric, a metal foam or a metal sponge.

5. The sandwich sheet (2) as claimed in any one of claims 1 to 4, characterized in that the core (4) is made of steel.

6. The sandwich sheet (2) as claimed in any one of claims 1 to 5, characterized in that the sheet metal facings (1, 1') are made of steel.

7. The sandwich sheet (2) as claimed in either of claims 5 and 6, characterized in that the sheet metal facings (1, 1') and the metal core (4) are made of steel, and the metal bonding agent (3, 3') is chosen from tin and its alloys, zinc and its alloys, and aluminum and its alloys.

8. A process for manufacturing a sandwich sheet (2), suitable for a forming and welding operation, and exhibiting excellent resistance to high temperatures, comprising two sheet metal facings (1, 1') having a melting point T_f, these being bonded together by a metal core (4) having a melting point T_c, it being possible for T_c to be equal to or different from T_f, the core (4) having a density of less than the density of each of the facings (1, 1'), characterized in that it comprises the steps consisting in:

- inserting the metal core (4) between the two sheet metal facings (1, 1') precoated on at least one of their faces with a metal coating, the melting point T_{coat} of which is below the melting point T_f of the sheet metal facing and below the melting point T_c of the metal core, such that the coated face of each of the facings (1, 1') faces the core (4);
- heating the assembly formed by the two sheet metal facings (1, 1') between which the metal core (4) has been inserted at a temperature T lying between the melting point of the metal coating T_{coat} minus 50°C and the melting point of the metal coating T_{coat} plus 200°C, under speed and duration conditions such that the core (4) adheres to each of the facings (1, 1'); and
- cooling the assembly.

9. The process as claimed in claim 8, characterized in that, between the heating and cooling steps, pressure is applied to the assembly formed by the sheet metal facings (1, 1') and the metal core (4), said

pressure being adjusted so as not to damage the structure of the metal core (4).

10. The process as claimed in claim 8 or 9, characterized in that the assembly formed by the sheet metal facings (1, 1') and the metal core (4) is heated by induction.

11. The process as claimed in any one of claims 8 to 10, characterized in that the thickness of the metal coating of each of the sheet metal facings (1, 1') is between 5 and 350 µm.

12. The process as claimed in claim 11, characterized in that the thickness of the metal coating of each of the sheet metal facings (1, 1') is between 20 and 80 µm.

13. The process as claimed in any one of claims 8 to 12, characterized in that the rate at which the assembly formed by the sheet metal facings (1, 1') and the metal core (4) is heated is greater than or equal to 30°C/s.

14. The process as claimed in any one of claims 8 to 13, characterized in that the time during which the assembly formed by the sheet metal facings (1, 1') and the metal core (4) is heated is less than 15 s.

15. The process as claimed in any one of claims 8 to 14, characterized in that the melting point of the coating T_{coat} is less than 0.9 times the melting point of the sheet metal facing T_f and less than 0.9 times the melting point of the metal core T_c.

16. The process as claimed in any one of claims 8 to 15, characterized in that the internal face of each of the sheet metal facings (1, 1') is coated by hot dipping in a bath of liquid metal chosen from tin and

its alloys, zinc and its alloys and aluminum and its alloys.

17. The process as claimed in any one of claims 8 to 16, characterized in that the sheet metal facings (1, 1') are made of steel.

18. The process as claimed in any one of claims 8 to 17, characterized in that the density of the metal core (4) is less than the density of each of the sheet metal facings (1, 1').

19. The process as claimed in claim 18, characterized in that the core (4) consists of a metal wool, a knitted metal fabric, a woven metal fabric, a metal foam or a metal sponge.

20. The process as claimed in any one of claims 8 to 19, characterized in that the external face of at least one of the two sheet metal facings (1, 1') is coated with a coating, the melting point T_e of which is above the melting point of the metal coating that coats the internal face of each of the two facings (1, 1') T_{coat} plus 200°C.

21. A sandwich sheet that can be obtained by the process as claimed in any one of claims 8 to 20.

22. The use of the sandwich sheet (2) as claimed in any one of claims 1 to 7 and 21 for the production of automobile body parts formed, painted and then heat treated.

23. A part obtained as claimed in claim 22, characterized in that it is heat treated at above 160°C.